

What is Claimed is:

1. A stabilized diesel fuel composition comprising

a) a diesel fuel with a cetane number less than or equal to 50,

b) an effective amount of at least one compound selected from the group consisting of the cetane improvers and

c) i) an effective stabilizing amount of at least one compound selected from the group consisting of the stable nitroxide compounds or

ii) an effective synergistic stabilizing amount of at least one compound selected from the group consisting of the stable nitroxide compounds and at least one antioxidant compound selected from the group consisting of the aromatic amine antioxidants and the hindered phenolic antioxidants.

2. A composition according to claim 1 in which the cetane improvers are selected from the group consisting of the peroxides, thioaldehydes, tertiary alkyl primary amines, perketals, alkylether/peroxide blends, peracids, tetrazoles or triazoles, N,N-disubstituted organic nitroxides and the organic nitrates.

3. A composition according to claim 1 in which the cetane improvers are selected from the group consisting of the organic nitrates.

4. A composition according to claim 1 in which the cetane improvers are selected from the group consisting of the hydrocarbyl nitrates where hydrocarbyl is a straight or branched chain alkyl of 1 to 24 carbon atoms, straight or branched chain alkyl of 2 to 24 carbon atoms interrupted by one to three oxygen atoms, straight or branched chain alkenyl of 3 to 24 carbon

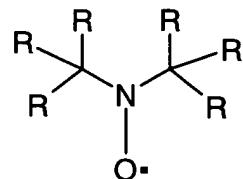
atoms, cycloalkyl of 5 to 12 carbon atoms or C₁-C₄alkyl-substituted cycloalkyl of 5 to 12 carbon atoms.

5. A composition according to claim 4 in which hydrocarbyl is selected from the group consisting of methyl, ethyl, n-propyl, isopropyl, butyl, amyl, hexyl, heptyl, octyl, isoctyl, 2-ethylhexyl, nonyl, decyl, allyl, cyclopentyl, cyclohexyl, methylcyclohexyl, cyclododecyl, 2-ethoxyethyl and 2-(2-ethoxyethoxy) ethyl.

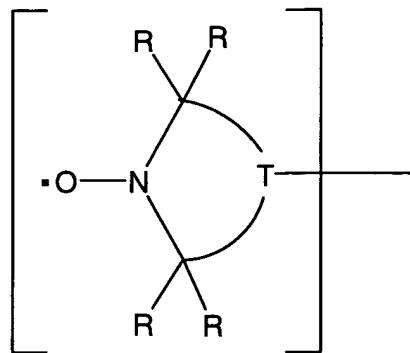
6. A composition according to claim 4 in which the hydrocarbyl nitrate is 2-ethylhexyl nitrate.

7. A composition according to claim 1 where the stable nitroxide compounds are hindered amine nitroxide compounds that comprise a nitroxyl moiety flanked by two tertiary carbon atoms where the flanking tertiary carbon atoms may be further connected by bridging groups to form five- or six-membered cyclic structures.

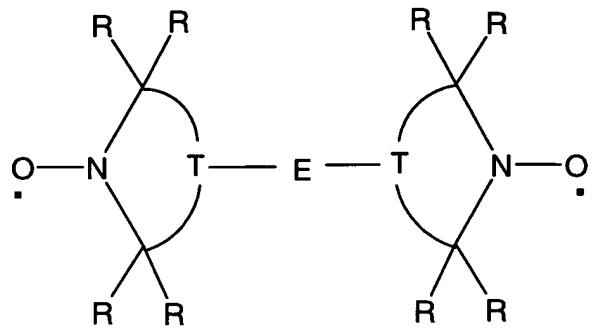
8. A composition according to claim 7 where the stable nitroxide compounds are of the formula



or are compounds that contain one or more groups of the formula



or are of the formula



where each R is independently methyl or ethyl, T is a group required to complete a 5- or 6-membered ring and E is a linking group.

9. A composition according to claim 1 where the stable nitroxide compounds are selected from the group consisting of bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) sebacate, 4-hydroxy-1-oxyl-2,2,6,6-tetramethylpiperidine, 4-ethoxy-1-oxyl-2,2,6,6-tetramethylpiperidine, 4-propoxy-1-oxyl-2,2,6,6-tetramethylpiperidine, 4-acetamido-1-oxyl-2,2,6,6-tetramethylpiperidine, 1-oxyl-2,2,6,6-tetramethylpiperidine, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-one, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl acetate, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl 2-ethylhexanoate, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl stearate, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl benzoate, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl 4-t-butyl-benzoate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) succinate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) adipate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) n-butylmalonate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-

yl) phthalate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) isophthalate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) terephthalate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) hexahydroterephthalate, N,N'-bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)adipamide, N-(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)caprolactam, N-(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)dodecylsuccinimide, 2,4,6-tris-[N-butyl-N-(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)]-s-triazine, 4,4'-ethylenebis(1-oxyl-2,2,6,6-tetramethylpiperazin-3-one), 2-oxyl-1,1,3,3-tetramethyl-2-isobenzazole, 1-oxyl-2,2,5,5-tetramethylpyrrolidine, N,N-bis-(1,1,3,3-tetramethylbutyl)nitroxide, N,N-diphenylnitroxyl, a mixture of mono- and dialkylated tert-butyl/tert-octyl-N,N-diphenylnitroxyls and a mixture of mono- and dialkylated nonyl-N,N-diphenylnitroxyls.

10. A composition according to claim 1 where the stable nitroxide compounds are selected from the group consisting of bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) sebacate, 4-hydroxy-1-oxyl-2,2,6,6-tetramethylpiperidine, 4-ethoxy-1-oxyl-2,2,6,6-tetramethylpiperidine, 4-propoxy-1-oxyl-2,2,6,6-tetramethylpiperidine, 4-acetamido-1-oxyl-2,2,6,6-tetramethylpiperidine, 1-oxyl-2,2,6,6-tetramethylpiperidine and 1-oxyl-2,2,6,6-tetramethylpiperidin-4-one.

11. A composition according to claim 1 where the stable nitroxide is bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) sebacate or 4-hydroxy-1-oxyl-2,2,6,6-tetramethylpiperidine.

12. A composition according to claim 1 in which component c) is present from about 0.05 ppm to about 10,000 ppm, by weight, based on the weight of the entire formulation.

13. A composition according to claim 1 in which component c) is present from about 0.1 ppm to about 1000 ppm, by weight, based on the weight of the entire formulation.

14. A composition according to claim 1 in which component c) is present from about 0.2 ppm to about 100 ppm, by weight, based on the weight of the entire formulation.

15. A composition according to claim 1 in which component c) is present from about 0.5 ppm to about 25 ppm, by weight, based on the weight of the entire formulation.

16. A composition according to claim 1 comprising an effective synergistic stabilizing amount of at least one compound selected from the group consisting of the stable nitroxide compounds and at least one antioxidant compound selected from the group consisting of the aromatic amine antioxidants and the hindered phenolic antioxidants.

17. A composition according to claim 16 in which the ratio of the stable nitroxide compounds to the antioxidant compounds is from about 1:99 to about 95:5 parts by weight.

18. A composition according to claim 16 in which the ratio of the stable nitroxide compounds to the antioxidant compounds is from about 1:10 to about 10:1 parts by weight.

19. A composition according to claim 16 in which the ratio of the stable nitroxide compounds to the antioxidant compounds is from about 1:5 to about 5:1 parts by weight.

20. A composition according to claim 16 in which the ratio of the stable nitroxide compounds to the antioxidant compounds is from about 1:3 to about 3:1 parts by weight.

21. A process for improving the filterability and improving the cetane number of a diesel fuel, which process comprises

adding to a diesel fuel with a cetane number less than or equal to 50,

b) an effective amount of at least one compound selected from the group consisting of the cetane improvers and

c) i) an effective stabilizing amount of at least one compound selected from the group consisting of the stable nitroxide compounds or

ii) an effective synergistic stabilizing amount of at least one compound selected from the group consisting of the stable nitroxide compounds and at least one antioxidant compound selected from the group consisting of the aromatic amine antioxidants and the hindered phenolic antioxidants.